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AIR QUALITY ASSESSMENT
THUNDER BAY TERMINALS LIMITED
THUNDER BAY, 1986.

Ministry of the Environment
Ontario

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Northwestern Region

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TECHNICAL SUPPORT SECTION
NORTHWESTERN REGION
ONTARIO MINISTRY OF THE ENVIRONMENT

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INTRODUCTION

Since 1978, Thunder Bay Terminals Limited has operated a bulk storage and trans-shipment facility adjacent to Thunder Bay harbour. Air assessment studies (including air quality monitoring, vegetation, soil and snow sampling) have shown that there has been no increase in dust levels off company property as a result of operations at the terminal. In 1986, the terminal processed nearly 3 million tons of coal, about 850,000 tons of potash, and a small quantity of agricultural products.

AIR QUALITY DATA

DUSTFALL

In 1986, monthly dustfall was measured at the six sites shown in Figure 1. Thunder Bay Terminals collected data at sites 1, 3, 6 and 7, while sites 9 and 10 were part of the Ministry's monitoring network.

Table 1 shows that at locations off company property (sites 1, 9, and 10), monthly dustfall exceeded Ontario's maximum acceptable limit of 7 $g/m^2/30$ d (grams of total dustfall per square metre during 30 days) during only one month at site 1 (Sewage Treatment Plant). There were no exceedences at site 9 (Kam Boating Club) or at site 10 (McKellar Hospital). The annual dustfall objective (4.6 $g/m^2/30d$) was met at all three off-property sites. At the three monitoring locations on Thunder Bay Terminals property, there was only one exceedence of the monthly objective (January, site 6).

Average annual dustfall at the six monitoring sites in 1986 was the lowest recorded since monitoring began in 1976 (Table 2).

TOTAL SUSPENDED PARTICULATE MATTER (TSP)

Particles of suspended particulate matter, being much smaller than dustfall particles, remain in the air for long periods. TSP at three locations was measured for a 24-hour period every sixth day during 1986, using a standard high-volume sampler. Table 3 shows that during 1986, TSP met the annual objective (60 $\mu g/m^3$) at all monitoring sites. There were six exceedences of the daily objective (120 $\mu g/m^3$) on company property (site 3), and two exceedences off-property (one each at sites 1 and 10). The high reading of 387 $\mu g/m^3$ on July 25 at one of the off-property sites (Site 1) was caused by particulate matter from roofing activity. Average TSP at the three sites was similar to values recorded for many of the 10 preceding years (Table 4).

CONCLUSION

Average dust levels, measured as dustfall and total suspended particulate matter, continued to be recorded at acceptable concentrations around Thunder Bay Terminals in 1986. Monitoring is being continued to ensure compliance with provincial air quality objectives.

ACKNOWLEDGEMENT

The Ministry thanks Thunder Bay Terminals Limited for providing data on dustfall and TSP from its monitoring network.

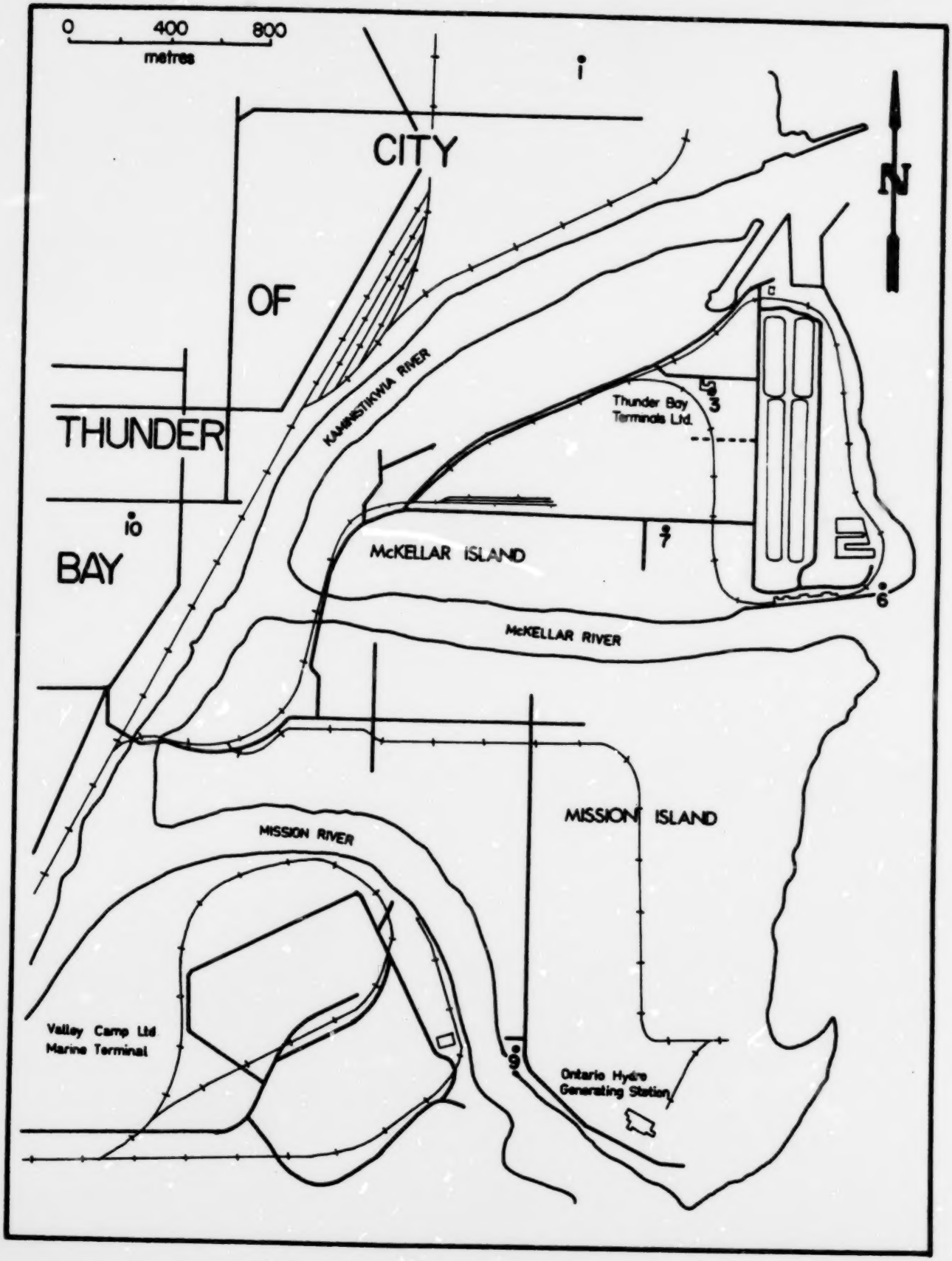

Figure I. Air quality monitoring sites, Thunder Bay Terminals, 1986.

TABLE 1. Total dustfall (g/m²/30 days) near Thunder Bay Terminals Limited, 1986.

Site	Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
1	Sewage Treatment Plant	0.3	0.2	1.8	2.8	3.0	2.6	3.7	2.0	1.8	0.6	1.0	1.6	1.8
3[a]	Thunder Bay Terminals	1.9	1.0	2.3	6.0	4.5	6.1	5.0	3.6	2.6	2.0	5.7	2.8	3.6
6[a]	Thunder Bay Terminals	<u>10.0</u>[b]	1.2	2.0	2.5	2.5	7.0	5.5	1.9	2.6	1.4	3.2	2.6	3.5
7[a]	Thunder Bay Terminals	0.3	0.2	1.0	3.8	2.1	4.2	3.8	2.4	5.1	0.5	1.7	2.0	2.3
9	Kam Boating Club	0.8	1.2	0.7	2.0	2.9	3.4	3.2	1.4	1.8	0.9	1.2	0.5	1.7
10	McKellar Hospital	1.4	1.7	3.1	5.0	3.4	5.0	3.9	2.8	2.1	2.5	1.9	1.3	2.8

[a]Sites on company property.
[b]Values exceeding maximum acceptable levels of 7.0 (monthly) or 4.6 (annual mean) are underlined.

TABLE 2. Average annual dustfall (g/m²/30 d) near Thunder Bay Terminals Limited, 1976-1986.

Monitoring site	Location	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
1	Sewage Treatment Plant	3.2	4.4	3.2	2.8	2.5	2.1	2.8	3.4	3.6	6.1[a]	1.8
3[a]	Thunder Bay Terminals	4.2	4.2	2.7	2.7	5.2	3.6	4.7	8.2	5.0	8.1	3.6
6[a]	Thunder Bay Terminals					8.5	6.9	8.8	19.5	15.3	15.7	3.5
7[a]	Thunder Bay Terminals					7.9	4.3	3.2	16.1	4.0	7.2	2.3
9	Kam Boating Club	5.6	4.6	4.3	4.2	2.5	2.1	3.4	1.7	2.1	1.9	1.7
10	McKellar Hospital	3.5	5.0	3.8	3.8	4.0	3.7	3.8	3.1	3.4	3.9	2.8
	Averages					5.1	3.8	4.4	8.7	5.6	7.2	2.6

[a] Sites on company property.
[b] Values above maximum acceptable level of 4.6 are underlined.

TABLE 3. Concentrations of total suspended particulate matter ($\mu g/m^3$) near Thunder Bay Terminals Limited, 1986.

Date	Monitoring sites[a] 1	3[b]	10	Date	Monitoring sites[a] 1	3[b]	10
Jan 2	50	51	44	Jul 1	41	35	46
8	42	13	59	7	55	80	48
14	25	27	24	13	16	43	30
20	46	59	46	19	47	48	48
26	11	13	13	25	387	203	47
				31	34	80	-
Feb 1	40	42	50	Aug 6	29	105	32
7	34	33	51	12	50	51	51
13	33	47	33	18	47	124	46
19	20	23	20	24	25	36	30
25	34	33	32	30	72	78	56
Mar 3	46	-	28	Sep 5	19	32	19
9	48	40	27	11	29	38	30
15	17	28	86	17	15	22	20
21	77	69	59	23	11	48	41
27	35	40	93	29	16	23	29
Apr 2	61	42	122[c]	Oct 5	10	22	12
8	22	34	31	11	22	24	25
14	16	287	99	17	53	47	58
20	16	29	26	23	41	64	51
26	36	43	-	29	38	48	29
May 2	25	34	41	Nov 4	47	45	44
8	15	73	52	10	21	54	25
14	62	61	91	16	32	62	35
20	52	155	77	22	31	58	45
26	100	166	81	28	-	-	36
Jun 1	28	60	41	Dec 4	19	25	20
7	30	47	40	10	26	29	-
13	34	48	43	16	85	96	-
19	53	213	74	22	60	62	39
25	70	98	56	28	33	47	41
				Annual mean:	34	49	40

[a] See Figure 1.
[b] Site on company property.
[c] Values above the 24-hour objective (120 $\mu g/m^3$) are underlined.

TABLE 4. Annual geometric means (µg/m³) of total suspended particulate matter near Thunder Bay Terminals Limited, 1976-1986.

Monitoring site	Location	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
1	Sewage Treatment Plant	41	31	27	30	28	31	28	27	38	28	34
3	Thunder Bay Terminals	47	33	34	33	33	39	32	42	59	37	49
10	McKellar Hospital	49	36	44	51	44	52	39	36	44	36	40

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